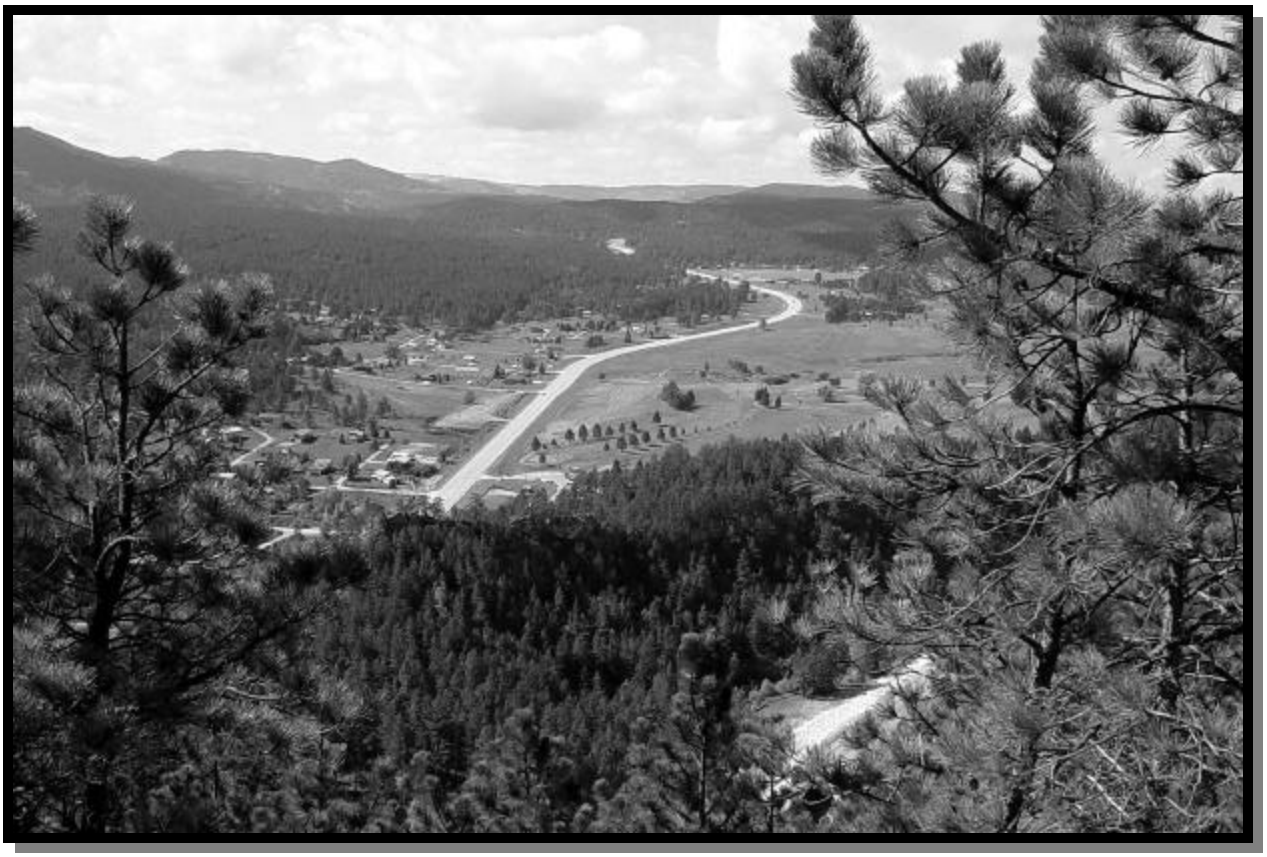
Elk Bugs and Fuels Final Environmental Impact Statement



Black Hills National Forest, Northern Hills Ranger District

Lawrence and Meade Counties, South Dakota

October, 2003

USDA Forest Service

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Agriculture

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Abstract: The Elk Bugs and Fuels Project is located in the northeastern portion of the Black Hills National Forest in Lawrence and Meade counties, South Dakota. Mountain pine beetle attacks in the Beaver Park area reached an epidemic stage several years ago. Mountain pine beetles have been moving out from the Beaver Park area and have now reached epidemic stages in adjoining areas. Public Law (P.L.) 107-206 was signed on August 2, 2002, allowing immediate treatment of the Beaver Park area as well as a specific amount of treatments in adjoining areas. The Black Hills National Forest has determined that more treatments than those authorized in P.L. 107-206 are necessary in order to reduce the spread of mountain pine beetle populations. Existing vegetative conditions, in addition to dead and dying trees caused by mountain pine beetle attacks, have created conditions making the area susceptible to catastrophic fire events. The Elk Bugs and Fuels Project was developed to reduce the spread of mountain pine beetle populations and to reduce the susceptibility of vegetation to catastrophic fire events. Public review of the Proposed Action during the scoping period identified seven issues. These issues led to the development of four alternatives considered in detail, including no new federal action. Alternative 1, No Action, proposes no additional treatments to reduce the spread of mountain pine beetle populations or to reduce the susceptibility of the project area to potential catastrophic fire events. Alternative 2, the Modified Proposed Action, proposes to create fuel breaks along selected roads and to reduce the basal area in many stands, making them less susceptible to mountain pine beetle attacks and more resistant to large catastrophic fire events. Alternative 3, Wildlife Emphasis, changes the configuration of some of the stands to be treated and, where appropriate, thins them to a lower basal area than Alternative 1 in order to provide more grass/forb habitat. Alternative 4, Wildland Urban Interface, adopts a suggestion provided by the Lawrence County Fire Advisory Board. It proposes the same treatments as Alternative 2 and additional treatments near private property where possible. All of the action alternatives propose decommissioning roads no longer needed for management purposes. The Forest Service Preferred Alternative for this Environmental Impact Statement is Alternative 4.

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CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

Document Structure

The Forest Service has prepared this Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

Chapter 1. Purpose of Need for Action: The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2. Alternatives, including the Proposed Action: This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Chapter 3. Affected Environment and Environmental Consequences: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by environmental component.

Chapter 4. Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.

Appendices: The appendices provide more detailed information to support the analyses presented in the environmental impact statement.

Index: The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Northern Hills Ranger District office in Spearfish, South Dakota.

Introduction

This Final Environmental Impact Statement (FEIS) discloses the environmental effects of vegetation management activities proposed in the Elk Bugs and Fuels Project Area. These activities are proposed by the Northern Hills Ranger District of the Black Hills National Forest to improve project area forest conditions by reducing mountain pine beetle populations in pine stands, decreasing the risk and hazard of wildfire in the proximity of private lands and homes, and reducing the susceptibility of vegetation to catastrophic fire and further mountain pine beetle attacks. The Draft Environmental Impact Statement was subject to a 45-day review and comment period. All comments received on the DEIS were reviewed and addressed in Appendix E.

The environmental analysis documented here is tiered to:

1) The 1997 Revised Land and Resource Management Plan ("Revised Forest Plan") for the Black Hills National Forest.
2) The Final Environmental Impact Statement ("Forest Plan FEIS") associated with the Revised Forest Plan.
3) The environmental assessment and decision notice for the 2001 Phase 1 Amendment ("Phase 1 Amendment") to the Revised Forest Plan.

Project Area Location

The Elk Bugs and Fuels Project is located in Lawrence and Meade counties, South Dakota, in the northeastern Black Hills. The area contains approximately 44,766 acres of National Forest Land and 15,605 acres of interspersed private and state lands and is located southwest of Sturgis, South Dakota. The project area includes all or portions of the legal descriptions shown in Table 1.

Table 1 Elk Bugs and Fuels Project Location

Project Area Location Legal Description		
Township	Range	Section
5 North	3 East	10,11,12,13,14,15,25,26
5 North	4 East	2,3,4,6,7,8,9,10,11,13,14,15,16,17, 18,19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35,36
5 North	5 East	7,18,19,20,21,27,28,29,30,31,32, 33
4 North	3 East	1,12
4 North	4 East	1,2,3,4,5,6,7,8,9,10,11,12,13,14, 15,16,17,20,21,22,23,24,25,26,27, 28,29,32,33,34,35,36
4 North	5 East	5,6,7,8,16,17,18,19,20,21,22,23, 24,25,26,27,28,29,30,31,32,33,34, 35,36
4 North	6 East	9,30,31
3 North	5 East	1
3 North	6 East	6

Background

Mountain pine beetle populations have been increasing in the Black Hills over the last five years. In 1999, 2000, and 2001, aerial surveys indicated a large mountain pine beetle infestation in and near the Beaver Park Inventoried Roadless Area on the Northern Hills

Ranger District. Nearly 70% of the forested land in the Beaver Park area was classified in the moderate to high stand susceptibility to infestation category in the year 2000. Veteran/Boulder Project proposed salvage and other treatments to address the insect infestation in Beaver Park. The project was litigated, and the resulting settlement prohibited treatment in and adjacent to the Inventoried Roadless Area ("Beaver Park Lawsuit Settlement Area"). Prior to the passage of P.L. 107-206, there had been no treatments in the Beaver Park Lawsuit Settlement Area. Mountain pine beetle attacks have spread to locations within the project area not included in P.L. 107-206. As a result, there are epidemic mountain pine beetle populations and associated high levels of tree mortality scattered throughout the project area.

In the fall of 1998 and spring of 1999, the area received heavy, wet snow, which when combined with winds, caused damage to trees across much of the analysis area. The broken-top trees provide suitable habitat for mountain pine beetles and the broken tops increase fuel loading for potential wildfires.

Wind and snow damage, combined with the effects of tree mortality due to mountain pine beetle infestation, could create fuel conditions that will not allow fire suppression forces to meet the suppression objectives in the Revised Forest Plan. The potential for a catastrophic wildfire event could increase with further mountain pine beetle infestation.

The areas of mountain pine beetle infestation and snow-damaged timber are in and near the proximity of the Fort Meade Veterans Admintistration Hospital Watershed, Sturgis Experimental Watershed, and Sturgis Community Watershed.

On August 2, 2002, the President signed P.L. 107-206. Section 706 of the Act authorized the Secretary of Agriculture "to undertake actions to address promptly the risk of fire and insect infestations;. . ." [Section 706(b)(1)]. A copy of the pertinent sections of P.L. 107-206 is available for review at the Northern Hills Ranger District office in Spearfish, South Dakota. The following is a summary of activities approved by the Act:

> " . . . the Secretary is authorized to treat additional timber within or outside the existing cutting units for the Piedmont, Kirk, Redhill, Cavern, Deadman, Danno, and Vanocker timber sales and within the analysis areas for these sales as is necessary to reduce beetle infestation and fire hazard;" [Section 706 (c)(1)]. The Act then gives details of the criteria to be used in implementing the additional treatments.
>
> Skid trails " . . .shall be restored to pre-existing conditions upon completion of treatment activities." [Section 706(c)(4)]
>
> Buffer Zones. "The Secretary is authorized to reduce risk to private property adjoining the Black Hills National Forest by treating insect infested trees, dead trees, and downed woody materials in T5N, R5E, BHM, Section 35, and T4N, R5E, BHM, Sections 1, 2, and 12 within 200 feet of adjacent property." [Section 706 (d)(1)]
>
> Additional Treatments. "The Secretary is authorized to treat for insects and fuel reduction National Forest System lands within ¼ mile of private property and other non-National Forest System lands near the community of Sturgis, and shall include, where feasible, the following locations:"
>
> T5N, R5E, BHM Sections 35, 27, 21, 20, and 18. [Section 706(d)(2)(A)]

T5N, R4E, BHM Sections 13, 11, 2, 3, and 4. [Section 706(d)(2)(B)]

Fuel Breaks. "The Secretary shall establish 400-foot fuel breaks as depicted on the map entitled 'Beaver Park Fuel Breaks and Fuel Treatment Areas', dated June 11, 2002" [Section 706(d)(3)] See Alternative maps in the map packet for the location of the legislated fuel breaks.

Section 706(d)(4) states that all of the activities discussed above that are outside of the Beaver Park Inventoried Roadless Area shall be limited to no more that 8000 acres of National Forest System land, pending issuance of a decision on this (Elk Bugs and Fuels) project.

Section 706(d)(5) authorizes the Secretary to treat not more than 700 acres within the Forbes Gulch area in order to reduce concentrated heavy fuels. The treatments shall not involve commercial timber sales or road construction, except that the Secretary may permit firewood cutters to remove the timber without construction of any roads.

Additional activities authorized by the Act include improvement of Forest Roads 139.1, 169.1b, 169.1d and 139.1b. The improvements will be minimal in accordance with Section 706 (e)(2).

Section 706(e)(4) authorizes the Secretary to construct two five-acre helispots within the Beaver Park Inventoried Roadless Area to transport firefighters and fire equipment into and out of the area.

As stated above, this is only an excerpt from P.L. 107-206. The Act includes more specific information, but this summarizes most of the activities approved for implementation. Section 706(k) of the Act states, in part, that ". . .the Secretary shall disclose the effect of actions authorized by this section in the proposed Elk Bugs and Fuels project cumulative effects analysis for past, present, and reasonably foreseeable future actions."

The Elk Bugs and Fuels project proposal was designed prior to the passage of P.L. 107-206, which authorizes a specific quantity of treatments on the Northern Hills Ranger District. The treatments authorized by P.L. 107-206 fall both within and outside of the Elk Bugs and Fuels project area and only treat a portion of the original planning area. The Black Hills National Forest has determined that more treatments than authorized by P.L. 107-206 are necessary in order to effectively reduce the spread of mountain pine beetle populations and to reduce the susceptibility of vegetation to catastrophic fire events.

As discussed above, the Elk Bugs and Fuels Project cumulative effects analysis must disclose the effects of the actions authorized by P.L. 107-206. Since many of the actions authorized by P.L. 107-206 fall outside of the Elk Bugs and Fuels Project boundary, it was necessary to expand the boundary of the cumulative effects area. The cumulative effects boundary encompasses eighteen 7th level sub-watersheds. See the Hydrology section of Chapter 3 for a description of the sub-watersheds and their location. The cumulative effects area includes the Elk Bugs and Fuels Project Area, the area known as the Beaver Park Lawsuit Settlement Area, and those sub-watersheds that contain the remaining actions authorized by P.L. 107-206. The total area for the cumulative effects

analysis is approximately 111,258 acres and includes 89,611 acres of National Forest System land and 21,647 acres of land in other ownership.

Management Areas

The revised Forest Plan assigns a management emphasis to each portion of the Forest to meet multiple-use objectives. For each designated management area (MA), Chapter 3 of the revised Forest Plan includes a description of desired future condition, goals and objectives, standards and guidelines. The Elk Bugs and Fuels Project includes the following management areas:

MA 3.31 – Backcountry Motorized Recreation Emphasis (426 acres)

These areas are managed to provide recreation opportunities on primitive roads and trails in a semi-primitive setting. (Revised Forest Plan) pp. III 27-31)

MA 3.32 –Backcountry Non-motorized Recreation Emphasis (1644 acres)

These areas are managed to provide recreation opportunities in a semi-primitive setting. Summer use is non-motorized. Over-the-snow vehicles could be allowed during the snow season. (Revised Forest Plan pp. III 33-37)

MA 5.1 – Resource Production Emphasis (11,604 acres)

These areas are managed for wood products, water yield, and forage production, while providing other commercial products, visual quality, diversity of wildlife and a variety of other goods and services. Numerous open roads provide commercial access and roaded recreation opportunities, while closed roads provide non-motorized recreation opportunities. (LRMP pp. III 65-69)

MA 5.2A –Fort Meade Veterans Administration Hospital Watershed (3,299 acres)

This area is managed to protect or improve the quality and quantity of water supplies to the Fort Meade Veterans Administration Hospital. (Revised Forest Plan pp. III 77-81)

MA 5.4 – Big Game Winter Range Emphasis (27,793 acres)

These areas are managed to provide high-quality winter and transitional habitat for deer and elk, high-quality turkey habitat, habitat for other species, and a variety of multiple uses. (Revised Forest Plan pp. III 95-100)

As discussed in the Background section, the cumulative effects area for the Elk Bugs and Fuels Project includes treatments approved by P.L. 107-206. The total cumulative effects area consists of those management areas described above, which cover the project area, plus two additional management areas.

MA 4.1 – Limited Motorized Use and Forest Products Emphasis (1,771 acres)

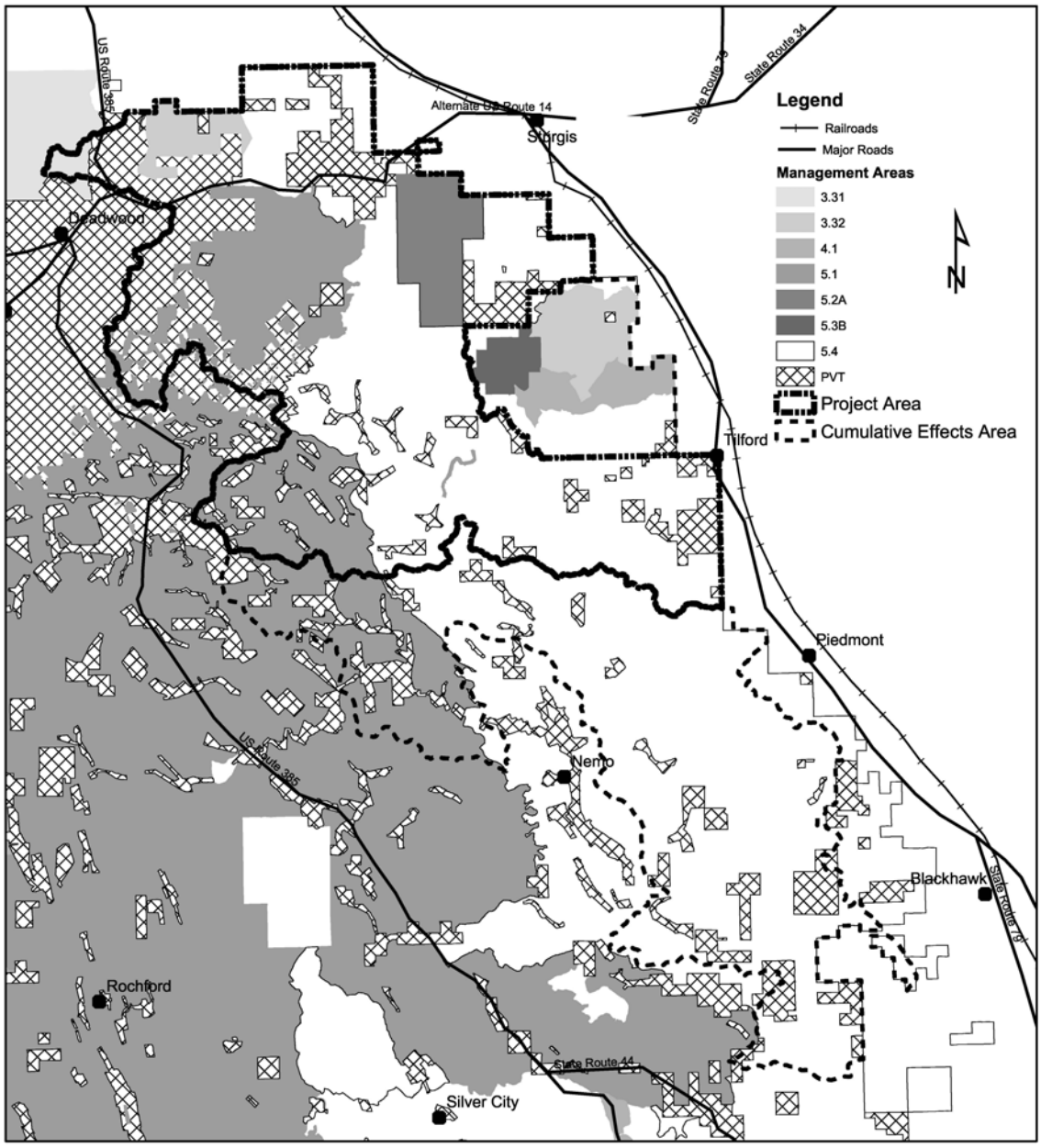
These areas are managed for non-motorized recreation, while providing for timber production, forage production, visual quality and a diversity of wildlife. Roads provide intermittent commercial access, but are normally closed to other than administrative use. (Revised Forest Plan pp. III 45-50)

MA 5.3B – Sturgis Experimental Watershed (1,070 acres)

This is an area managed to provide for experiments, tests and other activities that obtain, analyze develop, demonstrate and disseminate scientific information about protecting, managing and utilizing watershed resources. (Revised Forest Plan pp. III 89-94)

Management Area	Project Area Acres	Cumulative Effects Area Acres
MA 3.31	426	426
MA 3.32	1,644	4,274
MA 4.1	0	1,771
MA 5.1	11,604	18,164
MA 5.2A	3,299	3,299
MA 5.3B	0	1,070
MA 5.4	27,793	60,607

Figure 1 Management Areas



Purpose of Need for Action

The Purpose of Need for action in the Elk Bugs and Fuels Project area is based on the Revised Forest Plan, and analysis of mountain pine beetle activity completed by Forest Service Region 2 Forest Health Management staff. This project proposal is designed to move the area from its existing condition towards the desired future condition as described in the Revised Forest Plan. The Purpose and Need is to reduce mountain pine beetle populations in pine stands, decrease the risk and hazard of wildfire in the proximity of private lands and homes, and to reduce the susceptibility of vegetation to catastrophic fire and further mountain pine beetle attacks. The following "needs" have been identified in order to accomplish the purpose and need:

1. Mountain pine beetle populations have reached epidemic levels. Stand conditions are conducive to sustaining continued high levels of beetle caused mortality. Wind and snow damage combined with tree mortality due to mountain pine beetle infestation has created fuel conditions exceeding Forest Plan objectives. Therefore, there is a need to reduce the susceptibility of vegetation to uncharacteristically intense wildfire and outbreaks of mountain pine beetle. (Revised Forest Plan p.I-9)

2. There is a need to cooperate with the South Dakota Division of Forestry, Community of Sturgis, and other private entities in efforts to decrease the risk of a mountain pine beetle outbreak that could affect the Sturgis Community Watershed, private lands, and homes. Beetle control efforts are taking place within the Sturgis Community Watershed and private lands. Beetle control on National Forest System lands in the vicinity of this watershed is important to the success of control efforts taking place on adjacent lands. (Revised Forest Plan Goal 7)

3. Since mountain pine beetles are at epidemic levels throughout much of the project there is a need to reduce beetle populations in affected stands. (Revised Forest Plan Guideline 4205)

4. Since P.L. 107-206 did not authorize treatments adjacent to all areas of private lands and homes within the project area, there is a continuing need to reduce the susceptibility to catastrophic, high intensity wildfire in the proximity of these lands. (REVISED FOREST PLAN I-9)

5. There is a need to disclose the effect of actions authorized by Section 706 of P.L. 107-206, except for subsections (f)(1) and (g), in the cumulative effects analysis for past, present, and reasonably foreseeable future actions. [P.L. 107-206 Section 706 (k)]

6. In most cases, the natural succession of hardwood stands, in the absence of fire, moves towards ponderosa pine or white spruce. Hardwood stands are generally less flammable and burn less readily during wildfire. Therefore, there is a need to maintain or enhance the existing hardwoods by removing conifers. (Revised Forest Plan ,Objective 204)

7. Congress has recognized the importance of sustainable commodity use in laws including the Multiple-Use Sustained Yield Act, the National Forest Management Act, and the 1872 Mining Act. There is a need to emphasize long-term production of commodities for economies, communities and people in an environmentally sound manner. (Revised Forest Plan, I-17; Objective 303, p. I-18)

8. There is a need to provide an adequate transportation system for both short- and long-term access for the management of the National Forest lands within the Elk Bugs and Fuels Project Area. Investments to the existing Forest Service road system are needed to maintain or improve the safety or operating efficiency of roads. Where there is a need to initiate vegetative treatments and adequate access does not exist, investments in new roads are needed.

   Poorly maintained roads, improperly located roads, and roads no longer needed can have adverse effects on watersheds. There is a need to ensure that the transportation system within the project area will not degrade water quality. Opportunities exist to maintain and enhance water quality by eliminating roads no longer needed for management purposes. (Revised Forest Plan, Objective 309)

Proposed Action

The Northern Hills Ranger District of the Black Hills National Forest proposes to perform vegetation management to reduce the spread of mountain pine beetles and the threat and severity of potential wildfires through; commercial and non-commercial thinning, creating fuel breaks, removing encroaching pine from hardwood stands, and reducing fuels. The Proposed Action also proposes the associated road improvement activities necessary to implement the proposed treatments, and decommissioning of roads no longer needed for management purposes. A more detailed description of the Proposed Action can be found in Chapter 2.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action, the other alternatives, and the environmental consequences in order to make the following decisions:

(1) Whether or not the proposed activities and alternatives are responsive to the issues, are consistent with Revised Forest Plan direction, meet the purpose and need, and are consistent with other related laws and regulations directing National Forest management activities;

(2) Which actions, if any, to approve; and

(3) Whether or not the information in the analysis is sufficient to implement proposed activities.

Public Involvement

The Notice of Intent (NOI) was published in the Federal Register on November 15, 2002. The NOI asked for public comment on the proposal from November 15, 2002 to December 16, 2002. In addition, as part of the public involvement process, the agency mailed 1,538 scoping letters to organizations and individuals. A press release announcing the scoping period was prepared and an article published in the Rapid City Journal on November 17, 2002. The comment period for the project ended on December 16, 2002.

Using the comments from the public, other agencies, and organizations, the interdisciplinary team developed a list of issues to address.

Issues

The Forest Service separated the issues into significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations provides the direction for this distinction in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" A list of non-significant issues and reasons regarding their categorization as non-significant are found in Appendix A.

The Forest Service identified the following significant issues during scoping:

Issue A: Decommission fewer roads.

Members of the public expressed concern over the amount of road decommissioning. One concern was the potential effect proposed decommissioning could have on access for fire control. Another concern was that reducing the miles of roads available to the public would increase resource damage by concentrating use on the remaining roads.

Indicator measures: Miles of road proposed to be decommissioned.

Issue B: Use only existing roads and build no new roads.

Comments were received suggesting no new roads should be built. It was also suggested that fewer roads could be built by using existing road prisms.

Indicator measures: Amount of new road construction proposed for each alternative.

Issue C: Thin more areas, particularly small-diameter pine stands.

Comments suggest there should be more aggressive thinning of small-diameter pine stands. The concern is that without aggressive thinning, within a few years the forest may be in a similar condition regarding the potential for large fires and mountain pine beetle attacks.

Indicator measures: Number of acres of small diameter pine stands thinned.

Issue D: Provide more grass, forb, and shrub habitat within the project area.

Comments were received recommending more grass, forb and shrub habitat treatment within the project area. Suggested methods include; providing patch clearcuts within stands to be thinned, burning to benefit native hardwoods and shrubs, and variable-density thinning on north and south facing slopes. There are also opportunities to improve meadows by removing encroaching pine trees and burning to improve grass/forb habitat.

Indicator measures: Number of acres of grass, forb, shrub, and meadow habitat improved.

Issue E: Maintain or create big game habitat in Management Area 5.4.

A comment was received pointing out that if big game habitat were created or maintained in MA 5.4, it might reduce the amount of time these animals spend on private land.

Indicator measure: Big game habitat effectiveness.

Issue F: Propose more treatments near private property.

The Lawrence County Fire Advisory Board presented a plan proposing a 200-foot radius survivable space zone around structures in Lawrence County. The plan also proposes 197 Wildland-Urban-Interface "zones" around all inhabited structures in Lawrence County. The intent of these ½-mile radius buffer zones is to reduce fuels around private property with structures to the point where the average worst condition during a wildfire would not support a high-intensity

crown fire. This issue is based on a proposal for additional fuel reduction in the Wildland-Urban-Interface zones throughout the project area.

Indicator measure: Acres of treatments within ½ mile of private property.

Issue G: Do not harvest any commercial timber.

A commentater suggested an alternative proposing no commercial timber harvest. The alternative would accomplish mountain pine beetle treatments and fuel reduction without selling any commercial timber volume.

Indicator measure: Whether an alternative proposes commercial timber harvesting.

Other Related Efforts

Implementation of treatments authorized by Public Law 107-206.

CHAPTER 2 ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Introduction

This chapter describes and compares the alternatives considered for the Elk Bugs and Fuels Project, including a description of each alternative considered and a presentation of the alternatives in comparative form. The comparison of alternatives sharply defines the differences between each alternative and provides a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (e.g., more thinning near private land) and some is based upon the environmental, social and economic effects of implementing each alternative.

After agency and public comments were analyzed, alternatives were developed by the interdisciplinary team to respond to the significant issues described in Chapter 1. Alternatives were developed through consideration of management needs and opportunities as determined by on-the-ground investigations, agency concerns, and public input received through the scoping process. The alternatives display a range of options that: could be implemented to manage the Elk Bugs and Fuel Project Area; represent different levels of management; and provide a framework to analyze the significant issues described in Chapter 1. Alternatives eliminated from detailed study are included in this chapter.

Alternatives Considered in Detail

The Forest Service developed four alternatives, including the No Action, Modified Proposed Action, and two additional alternatives in response to significant issues.

The tables displaying the proposed activities in each alternative contain various types of silvicultural treatments and road system activities. More information on the types of treatments can be found in Chapter 3. For ease in interpreting these tables, the following brief descriptions are provided.

Vegetative Treatments

Commercial Thinning

Where topography and access allow, conifer stands would be thinned from below to 80 square feet of basal area per acre, or to ½ of their existing stocking, whichever is less. Thinning decreases stand density, increases tree vigor, and reduces stand susceptibility to mountain pine beetle attack. Thinning from below removes the smallest commercial trees in stands and retains the largest dominant and co-dominant trees. In most cases, stands that are commercially thinned would need follow-up treatment to thin the smaller non-commercial trees. Stands with less than 80 square feet of basal area have been found to be vigorous enough to withstand mountain pine beetle attacks.

Non-commercial Thinning

Areas with no access or ground conditions too rugged for logging equipment would be thinned as discussed in the description of commercial thinning, with the trees left on-site. Smaller diameter trees would be thinned at the same time.

Stands that are of non-commercial size would be thinned to approximately 170 trees per acre.

Note: For both commercial and non-commercial thinning, stands within 200 feet of private land and identified for fuel breaks would be thinned to a wider spacing, with at least 15-20 feet of spacing between tree crowns. Wider spacing would reduce the risk of wildfire spreading through the tree crowns in addition to decreasing the risk of mountain pine beetle infestation.

Commercial Hardwood Restoration

Selected stands would be treated to maintain or enhance the existing hardwoods by removing conifers. Hardwood stands are generally less flammable and burn less readily during a wildfire, so it is desirable to maintain these stands, especially near private lands and homes. In most cases, the natural succession of hardwood stands, in the absence of wildfire is to ponderosa pine. Trees of commercial size would be removed from the site.

Non-commercial Hardwood Restoration

Non-commercial hardwood restoration has the same purpose as commercial hardwood restoration. Trees of non-commercial size, or trees of any size in areas where lack of access or rugged terrain prevents their removal, would remain on site and would be treated for fuels reduction.

Sanitation Cutting

Sanitation involves treating pine trees currently infested with mountain pine beetles prior to beetle maturation and emergence. This treatment reduces mountain pine beetle populations in local areas, and allows merchantable timber to be salvaged in some cases. Mountain pine beetles usually attack trees from early July through mid-September. The freshly attacked trees could be cut and processed at a sawmill, or cut and treated on site to kill the beetle larvae, which live just under the bark. This work would start in the early fall, but must be completed before the beetles start flying in July. Forest workers must carefully search an area for beetle-infested trees, looking for pitch tubes, signs of woodpecker activity, or boring dust at the base of trees. Once the trees are located and marked, logging crews or contract fellers would salvage or treat the infested trees.

Bait and Sanitation Cutting/Commercial Thinning, Bait and Sanitation Cutting

Mountain pine beetles can be lured into an area with pheromone bait. Mountain pine beetles would attack the baited trees and adjacent trees. In the fall, winter, and spring, baited trees would be cut and processed at a sawmill to kill the beetle larvae. This treatment would be used to increase the effectiveness of sanitation cutting. Beetles can be lured to areas where sanitation efforts can readily take place. The local beetle population would determine the amount of tree mortality at any one baiting site. This treatment reduces mountain pine beetle populations in local areas and merchantable timber can be salvaged. Some stands would be commercially thinned in addition to the bait and sanitation treatment

Shaded Fuel Breaks

Creating fuel breaks along roads would involve thinning the overstory trees to 15-20 feet between the crowns. Understory conifers would be removed. Surface fuels would be removed or intensively treated. Branches on conifers left within the fuel break would be pruned up to 10 feet from the ground. The dimensions for the fuel breaks would be up to a distance of 200 feet on each side of the road surface edge.

Meadow Enhancement

Meadow enhancement consists of removing encroaching ponderosa pine trees and burning where appropriate.

Patch Cuts (Wildlife Habitat Prescription)

The intent of this prescription is to create habitat diversity within monocultures of young regenerating pine stands. Treatments include removing all trees within an area of two to ten acres within a given treatment stand. More than one patch cut may be created within a treatment stand. Residual slash in patch cuts would be treated. Methods of treatment could include lop and scatter, pile and burn, and prescribed burning.

Prescribed Burning

Prescribed burning is proposed in and around meadows to increase grass, forb, and shrub habitats preferred by wildlife.

Transportation Activities

New Construction

New road construction is defined as an investment in construction of a road that results in a new road corridor.

Reconstruction

Road reconstruction is defined as an activity that results in improvement or realignment of a road. These investments in reconstruction activity raise the traffic service level of a road or improve its safety or operating efficiency. Realignment results in a new location of an existing road, or portions of existing road, and treatment of the old roadway. Activities are proposed to minimize sediment runoff and provide safe driving conditions.

Decommissioning

Decommissioning is defined as an activity that results in the stabilization and restoration of unneeded roads to a more natural state. There are five levels of decommissioning, including: 1) blocking roads, 2) re-vegetating roads, 3) removing culverts, 4) removing unstable fills, and 5) re-contouring roadbeds. All roads proposed for decommissioning in the action alternatives are non-system "two track" roads developed through public use over time with the exception of 0.7 miles of Forest Road 557.1.

Alternative 1: No Action

Under the No Action alternative, projects with signed decisions would continue to be implemented under the current Forest Plan. No hardwood restoration, thinning, prescribed burning, fuel breaks or transportation activities would be implemented to accomplish project goals.

Under Alternative 1, management activities approved in previous documents and those approved by P.L. 107-206 would continue, but no new federal management activities would be initiated. Beyond completing on-going and previously approved activities, Alternative 1 would allow ecological processes to control vegetative development and mountain pine beetle activity. Commercial thinning, non-commercial thinning, commercial thinning with bait and sanitation cutting, and bait and sanitation cutting would not occur to help meet the need to control the spread of mountain pine beetle populations and reduce the susceptibility to intense wildfires. Shaded fuel breaks and prescribed burning would not be implemented to reduce the threat and severity of potential wildfire events. Commercial and non-commercial hardwood restoration treatments would not be implemented. Changes, such as road maintenance, could occur through current management direction, natural processes, or other management decisions in the future.

Alternative 2: Modified Proposed Action

The Modified Proposed Action was developed in order to move the project area from the existing condition towards the desired future condition as described in the Revised Forest Plan and to meet the purpose and need as described in Chapter 1 of this EIS.

This alternative is similar to the Proposed Action described in the Notice of Intent and distributed to the public in the Scoping Letter. Modifications to the original Proposed Action were made to reflect changes resulting from public comments, and additional survey information, decreasing the amount of new road construction, and better managing goshawk nesting habitat. The original Proposed Action has been moved to the Alternatives Considered but Eliminated from Detailed Study section of Chapter 2.

The Modified Proposed Action is designed to reduce the susceptibility of pine stands to attack by mountain pine beetles. The primary method of treatment is to reduce the basal area of stands to below 80 square feet of basal area per acre by prescribing both commercial and non-commercial thinning. The Modified Proposed Action also proposes to use a technique that lures mountain pine beetles to pre-selected stands with pheromone bait. The infested trees would then be cut and treated to kill the beetles.

Ponderosa pine trees are invading many hardwood stands. Alternative 2 proposes to remove encroaching pine trees, both commercially and non-commercially, in order to maintain or improve the diversity that hardwood stands provide.

Vegetation treatments are also designed to reduce the threat and severity of potential wildfires, particularly in the vicinity of private land. Many of the thinning treatments described above are located in the wildland-urban-interface (WUI) to reduce fuels and resistance to control in these areas. In addition to thinning, the Modified Proposed Action prescribes shaded fuel breaks along specific road corridors in order to prevent the spread of fire should one occur. Prescribed burning is also proposed in some areas in order to reduce the fuel loading.

New road construction, reconstruction, and decommissioning are proposed in Alternative 2. The specific locations of the activities proposed in Alternative 2 can be found on the Alternative 2 map, located in the Map Set. Table 2 provides a summary of the treatments and transportation system activities proposed in Alternative 2.

Table 2 Alternative 2 Proposed Treatments and Activities

Alternative 2 Proposed Treatments and Activities		
Treatment	**Amount**	**Units**
Commercial Hardwood Restoration	278	acres
Non-commercial Hardwood Restoration	45	acres
Commercial Thinning	5430	acres
Commercial Thinning and Bait and Sanitation Cutting	364	acres
Non-commercial Thinning	2264	acres
Bait and Sanitation Cutting	32	acres
Prescribed Burning	339	acres
Shaded Fuel Breaks	1635	acres
Transportation Activities		
New Road Construction	16.2	miles
Reconstruction	26.3	miles
Decommission Existing Roads	60.7	miles

Alterative 2 would harvest approximately 20,700 hundred cubic feet (CCF0 of sawtimber and 14,500 CCF of POL (products other than logs).

Alternative 3: Wildlife Emphasis

This alternative was developed to respond to Significant Issues D and E. Issue D suggests that grass, forb, and shrub habitat should be created within the project area to benefit wildlife species that utilize this type of habitat. Issue E suggests that big game habitat should be maintained or improved by enhancing forage on south slopes while maintaining cover on north slopes.

Alternative 3 proposes to leave stands on north slopes in their present condition in order to maintain or enhance thermal and hiding cover. Selected stands on south slopes will be thinned to not more than 60-70 square feet of basal area per acre in order to create more grass, forb and shrub habitat. Non-commercial thinning of stands consisting of small-diameter trees would be to approximately 170 trees per acre. This alternative proposes to enhance meadows by removing encroaching pine and burning where appropriate.

Low-intensity fire would be introduced into stands with south and west aspects, where conditions allow, in order to improve grass, forb, and shrub habitat.

Patch cuts are proposed on 594 of the 2,219 acres proposed for non-commercial thinning. The patch cuts are proposed in order to create scattered openings and would range in size from two to ten acres. The total amount of openings would not exceed 30 percent of any stand. See the Map Set for location of the proposed patch cuts.

The specific locations of the activities proposed in Alternative 3 can be found on the Alternative 3 map, located in the Map Set. Table 3 provides a summary of the treatments and transportation system activities proposed in Alternative 3

Table 3 Alternative 3 Proposed Treatments and Activities

Alternative 3 Proposed Treatments and Activities		
Treatment	**Amount**	**Units**
Commercial Hardwood Restoration	278	acres
Non-commercial Hardwood Restoration	45	acres
Commercial Thinning	2047	acres
Commercial Thinning followed by Prescribed Burning	2390	acres
Non-commercial Thinning	1577	acres
Non-commercial Thinning followed by Prescribed Burning	642	acres
Meadow Enhancement	170	acres
Meadow Enhancement followed by Prescribed Burning	59	acres
Prescribed Burning	1761	acres
Shaded Fuel Breaks	1635	acres
Transportation Activities		
New Road Construction	11.5	miles
Reconstruction	23.0	miles
Decommission Existing Roads	62.0	miles

Alternative 3 would harvest approximately 15,400 CCF of sawtimber and 9,700 CCF of POL.

Alternative 4: Wildland Urban Interface Emphasis

This alternative was developed to respond to Significant Issues A, C, and F. Issue A, decommission fewer roads, was generated by comments that the Proposed Action decommissions too many roads. The main concern was that some of the roads proposed for decommissioning could be used in the future for fire suppression access. The Forest Service reviewed the roads with respect to this issue and determined that most of the roads proposed for decommissioning in the Modified Proposed Action are not critical for fire suppression efforts. Roads 557.1, U090014, U090018, and U080017, totaling 4.8 miles, may be beneficial for future fire control efforts and are not proposed for decommissioning in this alternative. The remaining roads proposed for decommissioning in the Modified Proposed Action are also proposed for decommissioning in Alternative 4.

Issue F was generated from the Lawrence County Fire Advisory Board plan, which suggests using a 200-foot radius survivable space zone around structures and a ½-mile radius wildland-urban-interface zone of reduced fuels around all inhabited structures in the county. Both of the treatment proposals from Lawrence county would require more thinning. Issue C, thin more small diameter pine stands, is also addressed by the additional thinning proposed in this alternative.

Alternative 4 incorporates all of the treatments proposed in Alternative 2, the Modified Proposed Action. An additional 240 acres of commercial thinning and an additional 83 acres of non-commercial thinning are proposed in this alternative. Alternative 4 also prescribes burning on 1,211 acres within areas to be commercially thinned and 858 acres within areas to be non-commercially thinned. The principles of the Lawrence County Fire Advisory Board plan were applied to both Lawrence and Meade counties. While protecting potential goshawk nesting habitat, heritage sites, and sensitive plant habitat, an additional 240 acres of thinning are proposed in this alternative.

The specific locations of the activities proposed in Alternative 4 can be found on the Alternative 4 map, located in the Map Set. Table 4 provides a summary of the treatments and transportation system activities proposed in Alternative 4.

Table 4 Alternative 4 Proposed Treatments and Activities

Alternative 4 Proposed Treatments and Activities		
Treatment	**Amount**	**Units**
Commercial Hardwood Restoration	278	acres
Non-commercial Hardwood Restoration	45	acres
Commercial Thinning	4459	acres
Commercial Thinning followed by Prescribed Burning	1211	acres
Commercial Thinning and Bait and Sanitation Cutting	364	acres
Non-commercial Thinning	1489	acres
Non-commercial Thinning followed by Prescribed Burning	858	acres
Bait and Sanitation Cutting	32	acres
Prescribed Burn	874	acres
Shaded Fuel Breaks	1635	acres

Transportation Activities		
New Road Construction	16.2	miles
Reconstruction	26.3	miles
Decommission Existing Roads	55.9	miles

Alterative 4 would harvest approximately 21,300 CCF of sawtimber and 14,900 of POL.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need. A list of these alternatives and the reasons they were not considered further are included below:

Original Proposed Action

The original Proposed Action was presented to the public during the scoping period. During the scoping period, the interdisciplinary team discovered that it had inadvertently included for harvest consideration stands that could potentially provide goshawk nesting habitat. Until surveys are completed to determine those stands having active nests, or requiring designation as alternate conifer-forested goshawk nest stands, it must be assumed that goshawks are present. The original Proposed Action could violate Forest Plan Standard 3110 and would therefore be non-compliant with the Revised Forest Plan.

This alternative proposed approximately 42.9 miles of new road construction. This high amount of new road construction would impact the various resources to a greater extent than the modified proposed action alternative. It was discovered from comments received during the scoping process that several of the roads proposed for decommissioning are under Special Use Permits to the Dakota Territory Cruisers and Black Hills Four Wheelers clubs, making it necessary to remove these roads from the list of roads proposed for decommissioning.

Not all stands approved for treatment under P.L. 107-206 had been located on the ground at the time the Proposed Action was developed for the scoping process. Some of the stands chosen for treatment as part of P.L. 107-206 were part of the original Proposed Action for the Elk Bugs and Fuels Project so adjustments were necessary.

The results of botany surveys were received after the original Proposed Action was formulated. The survey information indicated that many of the proposed units could have the potential to affect sensitive plant habitat.

For the reasons discussed above, this alternative was eliminated from detailed study.

The original Proposed Action proposed four non-significant Forest Plan amendments. As discussed above, potential goshawk nesting habitat and potential sensitive plant species habitat were removed from the original Proposed Action as part of the creation of the

Modified Proposed Action. Reduction of the total amount of area proposed for treatment in all action alternatives negated the need for the four non-significant Forest Plan Amendments for forest-wide Standard 3203, MA 5.4 Standard 2101, MA 5.4 Standard 3203, and MA 3.31 Standard 3202.

Only Use the Existing Road System and Build No New Roads

The Forest Service considered an alternative raised by the public (Issue B) limiting treatments to areas accessible by the existing road system. This alternative was eliminated from detailed study because limiting treatments to areas accessible from existing roads would not treat enough area to have a substantial effect on the spread of mountain pine beetle infestations. Large areas would be left untreated and could be subject to mountain pine beetle attack. The same principle would apply to reducing susceptibility to catastrophic fire events. Large, contiguous areas of dense pine stands would remain and potentially contribute to catastrophic fire events. For these reasons, this alternative was eliminated from detailed study.

Propose Treatments without Commercial Timber Harvest

The Forest Service considered an alternative raised by the public (Issue G) proposing treatments to reduce the susceptibility of pine stands to mountain pine beetle attack and initiating fuels reduction treatments, without commercial timber harvest.

Goal 3 of the Revised Forest Plan is to provide for sustained commodity uses in an environmentally acceptable manner (Revised Forest Plan p. I-17). Goal 6, Objective 601 is to "strive to reduce net costs of both market and non-market programs" (Revised Forest Plan, p.I-35). Both of these goals relate to Elk Bugs and Fuels Project Need Statement 7.

This alternative was eliminated from detailed study because it does not meet Goals 6 and 7 of the Revised Forest Plan.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative.

Summary Comparison of Alternatives by Proposed Treatments

Table 5 Comparison of Proposed Activities by Alternative

Activities by Alternative				
Activity	Alt 1	Alt 2	Alt 3	Alt 4
Vegetation Management Treatments (Acres)				
Commercial Hardwood Restoration	0	278	278	278
Non-commercial Hardwood Restoration	0	45	45	45
Total Hardwood Restoration	**0**	**323**	**323**	**323**
Commercial Thinning	0	5,430	2,047	4,459
Commercial Thinning followed by Prescribed Burning	0	0	2,390	1,211
Commercial Thinning with Bait and Sanitation Cutting	0	364	0	364
Total Commercial Thinning	**0**	**5,794**	**4,437***	**6,034**
Non-commercial Thinning	0	2,264	1,577	1,489
Non-commercial Thinning followed by Prescribed Burning	0	0	642	858
Total Non-commercial Thinning	**0**	**2,264**	**2,219**	**2,347**
Bait and Sanitation Cutting	0	32	0	32
Meadow Enhancement	0	0	170	0
Meadow Enhancement followed by Prescribed Burning	0	0	59	0
Fuels Treatments (Acres)				
Prescribed Burning	0	339	1761	874
Shaded Fuel Breaks	0	1,635	1,635	1,635

Activities by Alternative				
Activity	Alt 1	Alt 2	Alt 3	Alt 4
Transportation Activities (Miles)				
New Road Construction	0	16.2	11.5	16.2
Reconstruction	0	26.3	23.0	26.3
Decommission Existing Roads	0	60.7	62.0	55.9
Volume and Value				
Sawtimber Volume (Net CCF)	0	20,700	15,400	21,300
POL Volume (Net CCF)	0	14,500	9,700	14,900
Net Cash Flow** ($M)	0	-726	-2,307	-1,481

* Commercial thinning is to 60-70 BA in Alternative 3.

***Net cash flow is designed to show the relative difference between alternatives.

Comparison of the Alternatives to the Issues

Table 6 Response of Alternatives to Issues

Indicator Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Issue A. Decommission fewer roads.				
Miles of roads proposed to be decommissioned.	0	60.7 miles	62.0 miles	55.9 miles
Issue B. Use only existing roads.				
Amount of new construction proposed for each alternative.	0 Also, see Alternatives Considered But Eliminated From Detailed Study	16.2 miles	11.5 miles	16.2 miles
Issue C. Thin more areas, particularly small diameter pine stands.				
Small diameter pine stands thinned. *	0	9,693 acres	8,291 acres	10,016 acres
Issue D. Provide more grass, forb, and shrub habitat within the project area.				
Grass, forb, and shrub habitat improved. **	0	10,624 acres	10,281 acres	10,922 acres

Indicator Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Issue E. Maintain or create big game habitat in Management Area 5.4.				
Big game habitat effectiveness.***	Elk Summer-568 Elk winter-520 Deer Summer-501 Deer winter-474	Elk Summer-583 Elk winter-520 Deer Summer-512 Deer winter-475	Elk Summer-580 Elk winter-521 Deer Summer-514 Deer winter-477	Elk Summer-581 Elk winter-515 Deer Summer-510 Deer winter-470
Issue F. Propose more treatments near private property.				
Acres of treatments within ½ mile of private property.	0	9,251 acres	8,367 acres	9,881 acres
Issue G. Do not harvest any commercial timber.				
Whether or not an alternative proposes commercial timber harvesting.	No. Also, see Alternatives Considered But Eliminated From Detailed Study	Yes	Yes	Yes

* Includes all thinning, bait & sanitation, and fuel breaks.
** Includes all thinning, burning, fuel breaks, meadow enhancement, and bait & sanitation.
*** Big game habitat effectiveness is based on a scale of 0-1000, with a higher number indicating a higher habitat effectiveness.

Narrative Summary Comparison of Alternatives by Resource

Physical Environment

Hydrology and Soils

Existing conditions for soil and water resources would continue under Alternative 1. However, both resources would be at risk if a large and intense wildfire were to occur. It is estimated that there is a 28% probability of a 10,000 acre fire occurring within 10 years (Lewis, 2003). No roads would be decommissioned, allowing current road-related sediment and water contributions to continue.

All of the action alternatives would reduce the risk of soil heating, increased erosion, and nutrient loss due to a potential large fire. Under all action alternatives, overall road densities, and road densities within riparian zones, wetlands, and within 300 feet of streams are decreased. Development of fuel breaks under all action alternatives would be expected to enhance hardwood restoration. Implementation of any of the action alternatives would be expected to improve soil nutrients, and riparian vegetation, and reduce sediment erosion, and sediment contributions to streams. Alternative 2 provides the smallest potential increase in sediment available for delivery to streams due to timber harvest and prescribed burning. No significant impacts to water quality are expected.

Transportation

The following tables summarize the transportation activities in the project proposal.

Table 7 Proposed Transportation Activities by Alternative

Alternative	New Road Construction	Road Reconstruction	Decommission
1	0	0	0
2	16.2	26.3	60.7
3	11.5	23.0	62.0
4	16.2	26.3	55.9

Table 8 Road Density by Alternative in Miles/Square Mile

Alternative	Open Y/Long	Open Seasonally	Closed Y/Long	Decommissioned
1	1.5	1.5	0.4	0.0
2	1.1	1.2	0.5	0.8
3	1.1	1.2	0.5	0.8
4	1.1	1.3	0.5	0.7

Table 9 Percentage of Open and Closed Roads by Alternative

Alternative	Open Y/Long	Open Seasonally	Closed Y/Long	Decommissioned
1	43%	45%	12%	0%
2	31%	34%	14%	21%
3	31%	34%	13%	22%
4	31%	35%	15%	20%

Fuels

Thinning from below would reduce the ladder fuels in ponderosa pine stands. The larger trees that remain on the site would be more resistant to fire due to decreased flame lengths from the removal of ladder fuels. Reducing the density of stands, limiting ladder fuels, and reducing pine beetle mortality would result in less chance for a wildfire to escape initial attack and subsequently spread to the adjacent private lands. The decreased density would be less likely to support running crown fires. Alternatives 2 and 4 would generally reduce the density of the existing stands more than Alternative 3 would.

Shaded fuelbreaks in the action alternatives would substantially alter the expected fire behavior in areas that have both the small and large tree stocking reduced. The areas within the fuelbreaks where only smaller trees would be removed would result in a need for more effort and suppression forces to contain a fire. Less flammable patches of hardwoods along the fuelbreaks would be favored by reducing the pine trees in and directly adjacent to the sites.

Biological Environment

Vegetation

A large mountain pine beetle population exists, and there is suitable habitat for beetles in the project area and vicinity. The probable duration and extent of beetle-caused mortality throughout the area is unknown. Treatments that have altered stand structure and diversity have decreased the overall area at risk of mortality. Stands of ponderosa pine that have been thinned in the last 10-20 years are less susceptible to beetle-caused mortality, but large populations of beetles in nearby stands may continue to spread into these stands. On-going thinning and sanitation efforts in active timber sales and areas of treatment authorized by Public Law 107-206 should minimize mortality in treated areas. Alternatives 2, 3, and 4 would decrease stand susceptibility to beetle-caused mortality and reduce beetle populations. Suitable habitat may, however, continue to support a large population of beetles. If a large population of beetles continues to persist in the area, moderately stocked pine stands would be more likely to resist beetle infestation if sanitation efforts and treatments to reduce stand stocking took place than if no action were taken. Alternative 4 would do the most to decrease stand susceptibility to beetle-caused losses and reduce beetle populations, followed by Alternatives 2 and 3.

Wildlife

Diversity of habitat would continue to decline under Alternative 1 as non-conifer types are encroached, but overall tree densities could remain higher. Habitat could also be affected by the continuation of mountain pine beetle attacks. The risk of a large fire is higher under Alternative 1, and should such an event occur, there would be a significant effect on wildlife habitat.

The action alternatives would restore habitat diversity in treated hardwood stands and meadows. Mature spruce habitat would not be affected by any alternative. Density of existing snags is currently below Revised Forest Plan direction in all but one watershed and would not decrease under any alternative. All alternatives would move density and distribution of snags and large green trees toward compliance with the Revised Forest Plan in the long term.

Impacts to threatened, endangered, sensitive, and management indicator species that may occur as a result of proposed actions within the analysis area are expected to vary. No impacts to bald eagle would occur due to a lack of nesting habitat. Habitat for species associated with moderate and high density pine stands, including northern goshawk, black-backed and three-toed woodpeckers, and brown creeper, would decline. Due to the relatively large amount of potential suitable habitat remaining within the analysis area, however, impacts would not be likely to cause a trend toward federal listing or loss of viability.

Species associated with open stands of mature ponderosa pine, including pygmy nuthatch, flammulated owl, and Lewis' woodpecker, would be likely to benefit from

increased acres of potential suitable habitat. Species that rely on meadow habitat (loggerhead shrike, regal fritillary butterfly) would also be expected to benefit due to increases in suitable habitat. Species with less specialized habitat requirement (smooth green snake, Black Hills red-bellied snake) may be affected individually, but no trend toward federal listing or loss of viability is expected. Proposed actions would have no impacts on other species for which suitable habitat would not be affected (Townsend's big-eared bat, fringe-tailed myotis, northern leopard frog). Suitable habitat for marten (white spruce) would decrease slightly. Due to the relatively minor reduction, no trend toward federal listing or loss of viability is expected.

Alternative 1 would retain the most habitat for species relying on dense forest conditions while retaining the least amount of open forest habitat. The increased potential for catastrophic wildfires could, however, significantly affect habitat for species relying on dense stand conditions. The action alternatives would increase habitat for species associated with hardwood communities and more open pine habitat, and decrease habitat for species associated with dense forest conditions. The action alternatives would be expected to increase large trees on the landscape in the long-term when compared to Alternative 1.

Fisheries

The No Action alternative would have no direct effects on fisheries resources. Indirect effects would occur because existing roads would continue to contribute erosion at the current rate. No new roads would be built, but no existing roads would be decommissioned. Under the action alternatives, timber harvest, bait and sanitation cutting, and non-commercial thinning would have no direct effects on fisheries. None of these activities would occur within stream channels, and riparian corridors would be protected through the implementation of mitigation measures. Construction of temporary roads, skid trails and log landings would have no direct effects on fisheries.

Botany

In all action alternatives, known plant occurrences and areas deemed high quality habitat for R2 Sensitive and Species of Interest plants would be avoided during project implementation. Alternative 3 would have fewer indirect effects than Alternative 2, since treatments would be less intense and occur on fewer acres. Alternative 4 would have greater indirect impacts to plant habitat than Alternative 2 due to increased soil movement, risk of noxious weed introduction and spread, and greater livestock access resulting from additional treatments. Alternative 1 would not treat fuels, thereby allowing increased chance of wildfire. Wildfire would be expected to have a greater impact on habitat than the activities included in the action alternatives. Based on the analysis in Chapter 3 and the Biological Evaluation in the project file, the effects to R2 Sensitive and Species of Interest plants and their habitats would be kept below any reasonable level of significance under all action alternatives.

Noxious Weeds

All action alternatives would cause short-term increases in risks of introduction and spread of noxious weeds from equipment used during project implementation as well as reductions of soil cover. Reduction of soil cover increases the risk of introduction and spread of noxious weeds. Noxious weed infestations are a particular threat to unusual plants and their habitats. Alternative 4 would have a slightly higher risk of noxious weed introduction and spread than Alternative 2 or 3. Mitigations to prevent the introduction and spread of noxious weeds into the proposed treatment areas have been built into the project (including avoiding known infestations during project implementation and requiring equipment operating off-road to be free from weeds and soil before entering and leaving the project area) and would reduce the risk of negative indirect effects from noxious weeds.

Range

The main difference between the alternatives is the amount of forage produced. Alternatives 2 and 4 would be expected to cause similar increases in forage as a result of thinning, while Alternative 3 would be expected to cause less of an increase. In general, more forage and livestock access would be generated under Alternative 4.

Social Environment

Recreation

The only difference in effects on recreation is the number of roads decommissioned in each alternative. Alternative 1 would not decommission any existing roads, so there would be no impacts to motorized recreation. Alternative 2 would decommission 60.7 miles of undeveloped (non-system) roads within the project area. Alternative 3 would decommission 62.0 miles of non-system roads. Alternative 4 would decommission 55.9 miles of non-system roads.

Scenery

Scenic Classes

Scenic Attractiveness and Landscape Visibility are components of Scenic Classes. Therefore, the description of scenic classes addresses these scenery management components. Scenic classes 1 and 2 are landscapes that have been rated as areas of high public concern for scenery. Alternative 4 would treat the greatest area of scenic classes 1 and 2 (6,056 acres). Alternative 2 would treat 5,520 acres, followed by Alternative 3 treating 5,514 acres. The legislated activities add an additional 2,210 acres to any alternative. Scenic classes 3 through 5 are landscapes that have been rated as areas of moderate public concern for scenery. Alternative 4 would treat 4,700 acres, while 3,235 acres would be treated under Alternative 3 and 2,980 acres under Alternative 2.

Scenic Integrity Objectives (SIO)
Areas with a High SIO are naturally appearing landscapes. The number of acres proposed for treatment in High SIO areas differs by 150 acres across alternatives. Alternative 4 would treat the most (2,150 acres), followed by Alternative 3 (2,020 acres) and Alternative 2 (2,000 acres). An additional 630 acres will be treated under the legislated activities. Activities proposed in High SIO areas would likely change SIO to Moderate. Areas with a Moderate SIO appear slightly altered to the Forest visitor. The number of acres proposed for treatment in Moderate SIO areas are greatest in Alternative 4, followed by Alternatives 3 and 2, respectively. Implementation of these proposed activities would likely result in retaining the Moderate SIO. Areas of Low SIO appear moderately altered. The majority of proposed activities in areas of Low SIO occur in Alternative 2, followed by Alternatives 4 and 3, respectively. The proposed activities would not change the SIO level. Landscapes that appear heavily altered are classified as having Very Low SIO. Alternative 2 proposes to treat 440 acres in this SIO. Each of the other action alternatives would treat one acre of Very Low SIO. The proposed activities would not change the SIO level.

Visual Absorption Capability
Visual Absorption Capability (VAC) is the ability of the landscape to camouflage changes based on the natural landscape character. High VAC areas can withstand the most changes and still appear natural, while in areas of Low VAC, changes in the landscape will be apparent to Forest visitors. Only 12 acres of treatments are proposed in Low VAC in alternatives 2 and 4, and none in 3. Alternative 4 proposes to treat 3,930 acres of Moderate VAC, Alternative 2 proposes 3,780 and Alternative 3 would treat 3,780 acres. Activities proposed in High VAC cover 7,290 acres in Alternative 4, 7,040 acres in Alternative 3, and 6,580 acres in Alternative 2.

Recreation Opportunity Setting (ROS)
Semi-primitive Non-Motorized (SPNM) settings have subtle modifications to the landscape. Semi-primitive Motorized (SPM) settings may have obvious modifications to the landscape, but they do not attract attention of visitors in vehicles. Roaded Natural (RN) settings may have modifications to the landscape that are easily noticed and may dominate the landscape.

Proposed activities in SPNM are greatest in Alternative 3 (850 acres), followed by Alternative 4 (762 acres) and Alternative 2 (730 acres). Approximately 1.27 miles of new road construction would be obliterated upon completion of harvest in the units accessed by those roads (as shown in Appendix B, mitigation) in Alternatives 2 and 4, and approximately 0.6 miles in Alternative 3. This mitigation would maintain the SPNM ROS class that currently exists.

The majority of proposed activities would occur in the SPM setting. Alternative 4 would treat 8,280 acres, Alternative 2 would treat 7,530 acres, and Alternative 3 would treat 7,470 acres. The proximity of new roads to the SPM areas may convert the SPM areas to roaded natural ROS.

Activities proposed in the RN class would take place on 2,280 acres under Alternative 3, 2,190 acres under Alternative 4, and 2,120 acres under Alternative 2. These activities would maintain the ROS class.

Heritage

Timber and fire management result in various degrees of soil disturbance. Timber harvesting, skid trails, temporary road use, landings, movement of equipment, and piling and disposal of slash piles can adversely affect heritage resources. Alternative 4 would disturb the most acres, followed by Alternatives 2 and 3. Alternative 1 would result in no additional ground disturbance. As the amount of potential ground disturbance increases, the potential for disturbance and adverse effects on heritage resources also increases. Under Alternatives 2, 3 and 4, disturbance to heritage resources would be minimized through identification and avoidance or mitigation measures.

Heritage resources can be adversely affected by road construction and reconstruction activities. Adverse effects also occur under certain conditions through use of temporary roads and during road maintenance, closures, and decommissioning activities. Alternatives 2 and 4 would result in the greatest number of miles of road and hence have the greatest potential to affect heritage resources, followed by Alternative 3. Alternative 1 would result in the lowest potential to affect heritage resources.

The Forest would be in compliance with Section 106 of the National Historic Preservation Act under each alternative by avoidance of sites or the application of appropriate mitigation measures. All heritage resource site-specific mitigation measures were developed in consultation with the State Historic Preservation Office, Native American Tribes, and pertinent interested parties, pursuant to the National Historic Preservation Act of 1966, as amended.

Economics

Actions proposed under this project are designed to help achieve Forest Plan objectives and outcomes. Resource management practices have direct benefits and costs. The main criteria in assessing economic efficiency is Present Net Value (PNV), which is defined as the value of discounted benefits minus discounted costs. The financial values used for the economic analysis are from Black Hills National Forest cost guides based on experienced costs and revenues.

Present net value and benefit/cost ratios are displayed in the following table.

Table 10 Present net value and benefit/cost ratios

Measure	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Present Net Value	$0	-$725,978	-$2,307,134	-$1,481,003

Benefit/Cost Ratio	NA	0.69	0.34	0.53

Mitigation Common to All Action Alternatives

The Forest Service developed mitigation measures to be used as part of all of the action alternatives. Refer to Appendix B for the list of mitigation measures.

Monitoring Common to All Action Alternatives

District resource specialists would monitor implementation of Alternatives 2, 3 or 4, if selected. At least one interdisciplinary team meeting/field review would occur prior to the advertisement of any commercial timber sales to ensure that the objectives in this EIS are carried through the layout phase of timber sales. The proposed treatments would be monitored by resource specialists during project implementation as well as following completion of the prescribed treatments. The purpose of monitoring is to ensure that objectives are met and mitigation measures are implemented and effective. The final monitoring review would be conducted two years after a timber sale is closed. All interdisciplinary team field reviews would be documented and a final monitoring report completed after project implementation.

Some of the project implementation monitoring would be done by the timber sale administrator or other contract administrators. Other resource specialists would be involved in monitoring of specific mitigation measures relating to their particular resource area. Appendix C, the Monitoring Plan, includes details on what would be monitored, the methods to be used, timing and frequency, purpose, and responsible party.

Consistency with Revised Forest Plan and Phase 1 Amendment

The revised Forest Plan and Phase 1 Amendment contain direction in the form of forest-wide and management area goals, objectives, standards, and guidelines. Standards are limitations on management activities. Deviation from a standard requires a Forest Plan amendment. A guideline is a preferred course of action, and deviation is permissible if the responsible official documents the reasons for the deviation. Under the Phase 1 Amendment, certain guidelines are to be treated as standards (see USDA Forest Service [3] Appendix). Goals are broad, general statements of desired end results of management, and objectives describe measurable desired results to work towards achieving goals.

This project is within the scope of the revised Forest Plan analysis and contains no unusual or extraordinary features or circumstances. A full accounting of project compliance with revised Forest Plan and Phase 1 Amendment direction is located in the Project File. All action alternatives considered in detail meet Revised Forest Plan and Phase 1 Amendment direction with the possible exception of snags, although standard 2301 relating to snags may not currently be met in some watersheds, proposed activities and retention of green trees would move the project area towards compliance. Also, the

ongoing mountain pine beetle epidemic within the Elk Bugs and Fuel Project Area is expected to create numerous additional snags across the landscape in 4B and 4C stands under all alternatives.